

# **UTC** UNISONIC TECHNOLOGIES CO.,LTD.

F2962

Preliminary

# LINEAR INTEGRATED CIRCUIT

# HIGH EFFICIENT DIRECT PWM **DRIVE IC**

#### DESCRIPTION

The UTC F2962 is a high efficient, single phase and bipolar drive direct PWM drive motor driver IC. It is suitable for variable speed control FAN of personal computer's power supply radiation and CPU cooler with over temperature protection.

#### **FEATURES**

- \* Single phase bipolar drive(16V,2A output transistor built in.)
- \* Built in variable speed function with thermistor input signal. (External excitations direct PWM of upper side transistor control, low noise and low vibration.)
- \* Include re-circulation Diode and external parts are few.
- \* Include Hall bias circuit and thermal shut down circuit.
- \* Minimum speed settable.
- \* Full drive at open thermistor.
- \* Lock protect and auto restart function.
- \* FG output and RD output signal available.

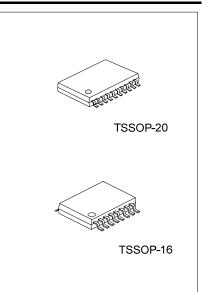
#### **ORDERING INFORMATION**

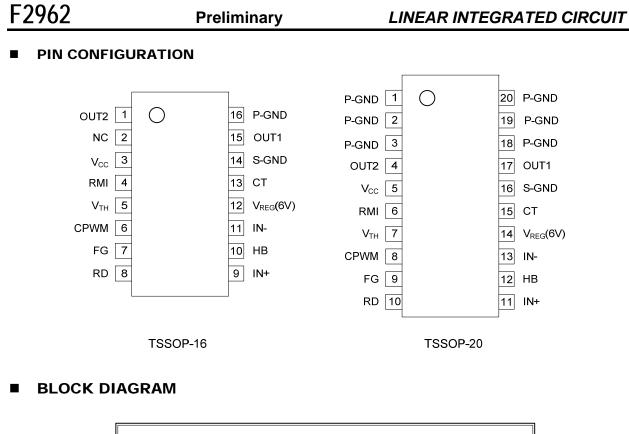
Ordering	Number	Daakaaa	Packing	
Lead Free	Halogen Free	Package		
F2962L-P16-R	F2962G-P16-R	TSSOP-16	Tape Reel	
F2962L-P20-R	F2962G-P20-R	TSSOP-20	Tape Reel	

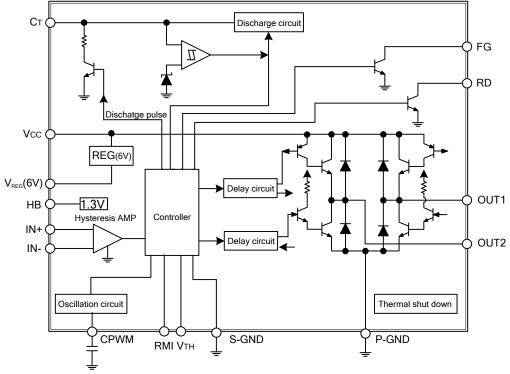
F2962G-P16-R	
(1) Packing Type	(1) R: Tape Reel
(2) Package Type	(2) P16: TSSOP-16, P20: TSSOP-20
(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

# MARKING

TSSOP-16	TSSOP-20		
16 15 14 13 12 11 10 9   UTC □□□□□ L: Lead Free   F2962 → G: Halogen Free   • □□□ L: Lead Free   • □□ ↓   1 2 3 4 5 6 7 8	P0 <t< td=""></t<>		







# ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V <sub>CC</sub>	18	V
Output Current		I <sub>OUT</sub>	2	А
Output Supply Voltage		V <sub>OUT</sub>	18	V
HB Output Current		I <sub>HB</sub>	10	mA
V <sub>TH</sub> Input Voltage		V <sub>IH</sub>	6	V
RD/FG Output Supply		$V_{RD/FG}$	18	V
RD/FG Output Current		I <sub>RD/FG</sub>	10	mA
Allowable Power Dissipation	TSSOP-16		1.1	W
(Note 2) TSSOP-20		PD	1.15	W
Junction Temperature		ТJ	+150	°C
Operating Temperature		T <sub>OPR</sub>	-30 ~ +90	°C
Storage Temperature		T <sub>STG</sub>	-40 ~ +150	°C

Note: 1.Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Mounted on a specified board (114.3mm×76.1mm×1.6mm, Glass epoxy).

# ■ **RECOMMENDED OPERATING CONDITION** (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>cc</sub>	4.5 ~ 16	V
V Threshold Input Voltage Range	V <sub>TH</sub>	0~9	V
Common- mode Hall Input Voltage Range	VICM	0.2 ~ 3	V

# ■ ELECTRICAL CHARACTERISTICS (V<sub>CC</sub>=12V, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
		Icc 1	Rotation mode	12	32	40	mA
Operating Current Drain		ICC 2	Lock protect mode	8	11	16	mA
6V Regulator		V <sub>REG(6V)</sub>	I <sub>REG</sub> =5mA	5.8	6	6.2	V
	High	V <sub>CRH</sub>		3.5	3.75	4.0	V
CPWM Voltage	Low	V <sub>CRL</sub>		1.95	2.0	2.15	V
CPWM Oscillation Frequer	псу	FPWM	C=100pF	18	25	32	KHz
C nin Valtaga	High	V <sub>CTH</sub>		3.4	3.6	3.75	V
C⊤ pin Voltage	Low	V <sub>CTL</sub>		1.5	1.6	1.85	V
C. Current	Charge	I <sub>CT1</sub>	V <sub>CT</sub> =1V	1.5	2.2	2.9	μA
C⊤ Current	Discharge	I <sub>CT2</sub>	V <sub>CT</sub> =4.2V	0.1	0.2	0.3	μA
C <sub>T</sub> Charge/Discharge Curr	ent Ratio	R <sub>CT</sub>	R <sub>CD</sub> =I <sub>CT1</sub> /I <sub>CT2</sub>	8.5	10.0	11.5	
Output Saturation	Lower side	V <sub>OL</sub>	Ι <sub>Ουτ</sub> =400mΑ		0.2	0.3	V
Output Saturation	upper side	V <sub>OH</sub> I <sub>OUT</sub> =400mA			0.9	1.1	V
HB Voltage		$V_{\text{HB}}$	I <sub>HB</sub> =5mA	1.1	1.25	1.4	V
Hall input sensitivity		V	Zero to peak including offset and		15	25	mV
		V <sub>HN</sub>	hysteresis		15	20	IIIV
RD/FG pin Low Voltage		$V_{FG}$	I <sub>FG</sub> =5mA		0.1	0.3	V
RD/FG pin Leak Current		I <sub>FGL</sub>	V <sub>FG</sub> =7V			30	μA



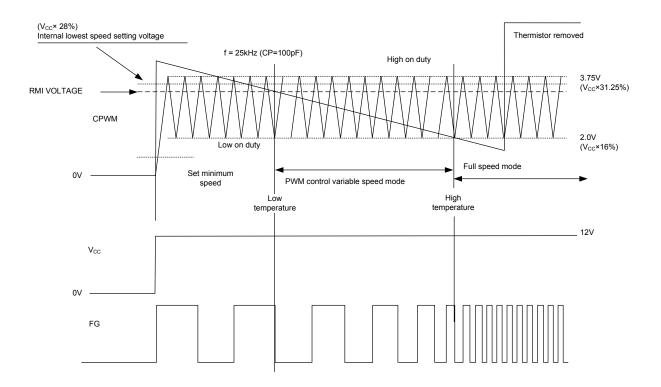
# Preliminary

# TRUTH TABLE

IN-	IN+	CPWM	СТ	OUT1	OUT2	FG	RO	MODE
Н	L		1	Н	L	L		ROTATION(DRIVE)
L	Н	L	L	L	Н	OFF		PWM OFF
Н	L				L	L		ROTATION(RECIRCULATION)
L	Н	Н	L	L	OFF	OFF		PWM OFF
Н	L			Н	OFF	L		
L	Н		Н	OFF	Н	OFF		ROCK PROTECT

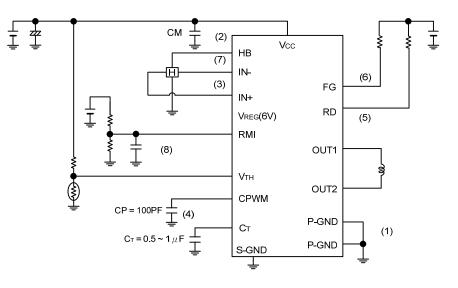
Note: CPWM-H = CPWM>V<sub>TH</sub>, CPWM-L = CPWM<V<sub>TH</sub>

# CONTROL TIMING CHART





# TYPICAL APPLICATION CIRCUIT



## (1) Voltage source-GND line layout

P-GND is connected to motor supply stage and S-GND is connected to control stage. Divides each line and external parts of control stage are connect to S-GND.

(2) Capacitor of re-circulation stability

CM capacitor that is for PWM drive and kick back absorption to be  $0.1 \sim 1\mu$ F for restrain V<sub>CC</sub> rising by kick back voltage. This IC is upper side transistor switching type then re-circulation current through lower side transistor. CM capacitor connects between V<sub>CC</sub>(VM) and P-GND with shortest and wide line.

## (3) Hall input

To be short lines for avoid noise. Hall input amplifier has 20mV hysteresis. Then we recommend the hall input revel to be 60mV or over.

## (4) PWM oscillation frequency setting capacitor

PWM basic frequency becomes 25KHz when put on CP=100PF.

## (5) RD output

Terminal is open corrector output. Low at rotation mode and High at stop mode. Open the terminal at no use.

(6) FG output

Output is open corrector. FG output according to rotation speed by phase change. Open the terminal at no use.

# (7) HB pin

1.25V voltage reference for hall element bias.

(8) RMI pin

The pin must be connected to V<sub>TH</sub> pin if no use. Lowest speed voltage is settled 10% duty inside.

If you set full speed mode when fan will start, capacitor is required.

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